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NUMBER 8

C.A.A. in All-Out Education and Training Drive

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First C.A.A. Group
Of Flight Officers
Finishes Course

The first group of civilian Flight Officers trained by the Civil Aeronautics Administration for commercial service overseas have completed training at the Pilot Training Division of Northeast Airlines and were graduated at Burlington, Vt.

These boys, graduates of the C. A. A. training programs, were selected from hundreds of trainees to take this course, the ultimate in C. A. A. flight instruction. Graduates will engage in American transport service abroad.

The Flight Officers course consists of nine weeks of training given in three stages covering advanced work in navigation, meteorology, instrument flying, and general airline flight procedures, including an intensive course in training in the operation of multi-engined equipment.

Each student selected for the course must have successfully completed the four previous steps in the C. A. A.'s controlled pilot training course, which furnish approximately 200 hours of flight training, and qualify the graduate for a commercial pilot's license and an instructor's rating.

Before being finally accepted for the Flight Officer course, the students are required to pass rigid physical and psychological tests as well as written and oral examinations given by the school.

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*Committee to Push
Aviation Teaching
In Nation's Schools*

The U. S. Office of Education and the Civil Aeronautics Administration have announced that they are joining forces in an all-out drive to "air-condition" American youth by stimulating aviation education in elementary schools and high schools. The C. A. A. has been training pilots in colleges and universities since 1939, and the proposed program is designed to round out this work by carrying aviation to secondary schools.

By turning over to schools responsibility for teaching preliminary units in basic air training, the move is intended to create in school youth a thoroughgoing knowledge basic to a candidate for pilot training and to increase public interest in aviation by instilling a thorough knowledge of aeronautics beginning in the earliest grades.

The Army and Navy, through their respective Assistant Secretaries for Air, Robert Lovett and Artemus L. Gates, will work with the two agencies to form policies and draft plans, it was announced.

Advisory Group

Assistant Secretaries Lovett and Gates, and Robert H. Hinckley, of Commerce, together with John W. Studebaker, U. S. Commissioner of Education, are ex-officio members of a joint advisory committee of national aeronautics.

(See SCHOOLS, page 111)

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Pilots for Army
Ferrying Command
Trained by C.A.A.

Under the direction of Bennett H. Griffin, trans-Atlantic flier and one of the earliest of the pioneers in the field of instrument and overweather flying, the Civil Aeronautics Administration is currently training three classes of pilots for the Army Ferrying Command at the C. A. A. Standardization Center in Houston, Tex.

One class has already been turned out and the graduates are on active duty all over the world, according to an announcement by Charles I. Stanton, Acting C. A. A. Administrator. Major Griffin plans to graduate successive classes every ten days.

The majority of the students admitted to this school have previously completed the C. A. A.'s advanced flight training courses, although applicants who have had a minimum of 450 solo hours, half on airplanes of 200 horsepower or more within the past two years, are given consideration in the selection of candidates.

Students are given concentrated instruction in instrument and overweather flying on multi-motored equipment and are taught to fly by dead reckoning as well as by radio to insure successful delivery of Army aircraft regardless of weather or other unusual conditions which may be encountered aloft.

Established for the purpose of stand-

(See FERRYING, page 105)



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Spanish Booklet Used

Copies of a booklet entitled, "Conversational Spanish for the Army Air Forces of the United States," have been issued by the Civil Aeronautics Administration to those flight contractors in the Civilian Pilot Training Program who are helping to train Inter-American pilots. The booklet contains a number of technical terms which it is believed will help in training.

Demand Growing For Women in Aircraft Industry

The trend toward increased use of women in war industries is nowhere more emphasized than in the aircraft industry. This is brought out in an article, "Industry Offers Increasing Opportunities for Women," in a recent issue of *DOMESTIC COMMERCE*, weekly bulletin published by the U. S. Department of Commerce.

While the article, written by Raymond Reeves, Regional Business Consultant, San Francisco, represents a survey of women's participation in all industry, it pays particular attention to their employment in aircraft plants. Following is a résumé of pertinent portions of the article:

Representatives of the Southern California aircraft industry have asked the State Industrial Welfare Commission to revise the manufacturing code, eliminating the provision prohibiting women from night work. The Commission is expected to do this. Such a change seems advisable in view of the fact that 56 major defense plants, including some of the country's largest aircraft factories, have told the California Department of Employment that they plan to hire 264,000 new workers—a 31 percent increase—during the first 6 months of 1942.

Women Already Working

Women are already working in aircraft factories, but the number so employed is relatively small. Lockheed recently offered jobs in its plants to all widows of Navy men killed at Pearl Harbor, if they needed work and were capable of handling jobs.

North American Aviation Co. has long used women for sewing and covering control surfaces of airplanes at their Inglewood, Calif., plant. The Dallas plant of this company tried using women in additional work, and found it so successful that it became a permanent policy there, and a decision was made to extend the policy to the Kansas City plant. Now the Inglewood plant is using women in the electrical subassembly department on all phases of subassembly electrical work, including electrical switch boxes and instrument panels. The director of industrial relations for this firm has announced: "We plan to use women on any job possible. Applicants need not have any industrial background to qualify for positions. However, we are giving preference to women whose husbands have been called into military service."

How are women working out in these jobs? The president of Fairchild, J. Carlton Ward, Jr., has said: "We are

(See *WOMEN*, page 112)



The contribution of an airport traffic controller to safer flight is a direct and important one. His job is to regulate airplane traffic on, and in the vicinity of, a landing area. This task has grown more complicated in recent months, with military planes adding heavily to the traffic at certain airports. Hence, at the request of the War Department and with the authorization of Congress, the Civil Aeronautics Administration has taken over the operation of traffic control towers at 37 airports, with others being commissioned.

An airport traffic controller is concerned with two primary objectives toward safer air navigation. One is to prevent collisions between, and unnecessary delays to, aircraft under his jurisdiction; and the other is to permit the proper use of a landing area by aircraft under his jurisdiction.

The first objective is accomplished primarily through visual inspection of air traffic on a landing area and within the airport control zone (a radius of 3 miles from airport). An airport traffic controller issues traffic clearances and instructions, telling pilots when to come in, when to hold a certain altitude, when to take off, or how to taxi after landing. When there is any congestion he issues landing sequence numbers.

Most communication from airport traffic control tower to pilot is conducted by radio, but towers are also equipped with light guns and may use these to transmit standard signals to pilots without radio.

Another function of the airport traffic controller is to relay traffic clearances received from the Airway Traffic Control Centers. In doing this he must see that airport traffic ties in smoothly with airway traffic. Airport towers are delegated certain responsibilities in controlling local traffic during instrument flying conditions.

To accomplish the second objective mentioned above, the airport traffic controller advises pilots as to wind conditions, possible obstructions on runways, and other hazards such as snowdrifts in winter; he informs pilots as to what runway and taxi strips to use in landing; he aids pilots in parking at the proper loading ramps; at night he turns on floodlights, etc.

Beyond these immediate duties, the airport traffic controller must also devise traffic and taxiing patterns for the safest and most efficient use of his airport.

Airmen Reminded To Watch Hazards Of Spring Weather

Following is the text of a safety bulletin issued by the Civil Aeronautics Board entitled "Spring Weather," and written by Paul A. Garreau, Specialist in Meteorology.

The experienced airman looks upon winter's departure with misgiving and concern. He knows that the period of transition marks the season of rapidly changing flying conditions, when extremes are likely to be encountered most frequently. In the past, thorough meteorological preparation before departure and reliance upon a highly efficient radio communication network during flight have combined to reduce the hazards of seasonal weather of this type. In view of the war restrictions imposed upon the dissemination of weather information, the Safety Bureau takes this opportunity to remind airmen and ground personnel concerned that flight plan preparation must receive even more careful consideration.

The advance of Spring upon retreating Winter is neither a gradual nor an orderly process. The lowest temperatures within the Arctic source region occur almost simultaneously with the return of much warmer and more moist air masses over the Gulf states. Cyclonic activity is high, both in frequency of development and severity. This situation is favorable for radical changes in flying conditions over tremendous areas, often with little warning. The average storm track reaches its southernmost position at this time which in turn results in placing some of the Nation's busiest airways directly in the path of many of the more severe cyclonic developments.

Although experienced pilots, dispatchers, meteorologists and other airmen



intimate with the operation of aircraft, scheduled and otherwise, are well acquainted with the many phases of spring flying weather, the following is offered by way of review.

CYCLONES

Cyclones usually have their inception as a wave on a front parallel to the Continental Divide, with the crest frequently over Colorado. Deepening and slow movement toward the Panhandle region are average behavior. Indication of a strong Polar outbreak developing over the Northwest, while the Gulf and deep Southern States experience unseasonably high temperatures with plentiful moisture, is a normal sequence of events. After passing the Panhandle, the disturbance which further deepens and moves more rapidly generally follows a path east-southeastward. The fronts are characteristically well developed by the time the depression has reached the Arkansas-Missouri area at which point there is a tendency to begin a recurve toward the northeast. At this stage of the cycle, central pressure is very often below 998 mbs (29.50 in.) and further reduction to the vicinity of 992 mbs (29.30 in.) is not uncommon. Subsequent path after the northeasterly trend is established is rather broad, the exit point varying from Lake Superior to the Gulf of St. Lawrence.

WINDS

The fresh surface winds which result from the steep gradient are of immediate interest to the operator and pilot of light and medium aircraft. However,

Johnson New Commander Of Civil Air Patrol

Earle L. Johnson, Executive Officer of the Civil Air Patrol, has been named National Commander by Director Landis of the Office of Civilian Defense. Mr. Johnson succeeds Maj. Gen. John F. Curry, U. S. Air Forces, who has been assigned by the War Department as Commander of the Fourth District Air Forces Technical Training Command with headquarters in Denver, Colo.

"Now organized with a Wing Command in every State, the Civil Air Patrol has proven itself as a hard-hitting and effective organization, quick to carry out the missions which the Army and the civilian defense units have entrusted to it," Director Landis said. "More than 37,000 citizens, 80 percent of whom are civilian pilots, already have enlisted to fly their own or rented planes on a wide variety of assignments primarily planned to relieve military planes and airmen for other duties. . . ."

the violence of the shifting winds associated with the entering edge of cold air for a considerable distance (along cold front) from the cyclone's center may, and occasionally does, reach proportions endangering even heavier transports. The astounding increases in velocity which occur in the upper winds along the warm front surface are of particular importance to instrument flight. Cloudiness and precipitation reduce the number of pilot balloon observations, and what few are available below the cloud level, or about the system's periphery, often prove to be misleading.

The situation is made more complex due to radio static in clouds and precipitation. Experience has shown that unless allowance is made for this phase, the flight crew may encounter bewildering drift angles, unbelievable gains or loss in elapsed time between fixes, depending upon the flight path in relation to the warm front alignment of the approaching energetic Spring disturbance. It will be readily appreciated that difficulty with radio communication after entering such a condition would serve to make matters much more complex. In extreme cases, such conditions have been known to develop rapidly into a full-blown emergency. On the other hand, a mentally prepared pilot would immediately recognize the true state of affairs and be guided accordingly.

THUNDERSTORMS

Thunderstorms are particularly troublesome during the transitional period (See SPRING HAZARDS, page 108)

6 Fatal Accidents Reported in February

Six fatal accidents in non-air-carrier flying were reported to the Safety Bureau of the Civil Aeronautics Board for the month of February 1942.

While performing show-off acrobatics at a low altitude, a pilot and his passenger were fatally injured when their plane fell off in a spin, went through high tension wires and struck the ground. In another accident, a pilot

and his passenger were fatally injured when the plane stalled in a turn at low altitude. In a third, a pilot and his passenger who were hunting coyotes were fatally injured when their aircraft crashed from a very low altitude.

A table showing the fatal accidents in January 1941 and 1942, and February 1941 and 1942 follows:

	Non-air carrier				Scheduled air carrier		Total
	Instructional	Pleasure	Commercial	No Details	Domestic	Foreign	
February 1942.....				13			6
February 1941.....	3	7			1		13
January 1942.....	2	2		3	1		8
January 1941.....	2	2	4	3	1		12

1 Investigator reports not yet received.



Board Urges Owners To Notify C. A. A. Of Address Changes

Following is the text of a safety bulletin issued by the Civil Aeronautics Board:

Your Address Please

From experience gained all over the country the C. A. A. uncovers deficiencies in aircraft which cannot be foreseen at the time the aircraft was built, but which, nevertheless, must be immediately attended to in order to maintain your aircraft in an airworthy condition.

For example, it was discovered recently that the rudder control cables and pulleys on a certain type aircraft were giving considerable trouble in service. The C. A. A. sent out Airworthiness Maintenance Bulletins by registered mail instructing them to replace certain parts of the rudder control system. Failure of the owner to do this resulted in a fatal accident.

Be sure to keep the C. A. A. advised of any change in address so that such bulletins can go to you with the least possible delay. Upon receipt of the bulletin be sure to comply with its recommendations before you fly your ship.

Mail your change of address to:
Certificate Division,
Civil Aeronautics Administration,
Washington, D. C.

INDIVIDUAL ACCIDENT REPORTS

Low Flying Over School Leads to Fatal Crash

Pilot Asa R. Hardin and his passenger, C. D. Elliott, were fatally injured in an accident which occurred at Ward, Ala., on May 16, 1941. Hardin held a private pilot certificate with a class 1 Land rating and had logged approximately 56 solo flying hours. The airplane, a Model 65-TL Aeronca, registered in the name of James M. Sharman, was demolished.

The pilot, accompanied by the passenger, had left Auburn, Ala., on May 15, on a cross-country flight to Emelle, Ala., where they spent the night. On the following morning the plane was observed in flight over Livingston and York, Ala. School teachers and children at Ward first saw the aircraft as the pilot flew low over the schoolhouse

and yard during morning recess. After making three low circles over the schoolyard, the pilot again approached from the southwest, barely clearing the tree tops. He descended lower as he neared the school. In an effort to avoid a group of trees about 60 feet high, which bordered the schoolyard, Hardin pulled the airplane up into a very steep climb. At the peak of the climb the airplane was stalled and the nose whipped down. The aircraft immediately crashed to the ground in a nearly vertical attitude in the schoolyard.

Investigation revealed no evidence of failure of the control system, the structure, or the engine prior to impact. The condition of the propeller indicated that the engine was developing considerable power at the time of the crash. There was no lack of fuel. The weather conditions had no bearing on the accident. The dual controls were connected and operative. Neither the pilot nor the passenger was equipped with a parachute. Investigation also disclosed that the pilot had been graduated in 1935 from the school over which the low flying was performed.

Probable Cause.—Loss of flying speed while attempting to avoid an obstruction at low altitude.

Contributing Factor.—(1) Recklessness of the pilot. (2) Inexperience of the pilot.

Fear of Overshooting Field Causes Student to Stall

Philip Auger was seriously injured in an accident which occurred on the Smithfield Airport, Smithfield, R. I., on April 18, 1941. He held a student pilot certificate and had a total of approximately 80 solo hours. The aircraft, a Fleet, Model 2, was demolished.

The student took off solo from the Smithfield Airport about 1:30 p. m. on a local practice flight. He made two uneventful take-offs and landings. Following the third take-off he practiced several turns, both steep and shallow, and then started an approach for a landing. The approach was high and when the aircraft was over the edge of the airport and at an altitude of about 150 feet, it was stalled and fell off to the right in a spin. After about three-quarters of a turn the aircraft struck the ground on its nose.

Investigation disclosed no evidence of failure of the control system, of the structure, or of the power plant. There had been ample fuel. The evidence indicates that the student, believing that he was about to overshoot the landing area, stalled the aircraft as he attempted a forward slip in order to land on the

airport without going around the field again. The student had learned to fly in lighter aircraft and although he had flown approximately 9 hours in the subject aircraft, he had not been checked out in it.

Probable cause.—Stall at low altitude during a landing approach.

Contributing factor.—Inexperience of the pilot.

Pilot Distracted, Aircraft Stalls and Goes Into Spin

Carl Gippe was seriously injured in an accident which occurred at Hialeah, Fla., on October 20, 1941. He held a student pilot certificate and had accumulated 55 solo hours. The aircraft, a Model 8A Luscombe, was demolished.

Gippe took off solo from the Municipal Airport. According to prearranged plans, he flew over a dairy, where flare parachutes were reported to have fallen the night before, and attempted to direct a friend on the ground to the parachutes. At an altitude of about 500 feet he entered a left spiral with power off and yelled out the window to his friend on the ground. The spiral continued to an altitude estimated as between 200 and 300 feet where the plane stalled and fell into a left spin. After about three-fourths of a turn the aircraft struck the ground on its left wing tip and cartwheeled on its nose and right wing.

Investigation revealed no evidence of failure of the structure or control system or of malfunctioning of the engine prior to impact. There was no lack of fuel. The weather did not contribute to the accident.

Probable cause.—Failure of pilot to maintain flying speed, resulting in a stall and spin from which recovery was not effected.

Contributing factor.—Action of the pilot in allowing his attention to become distracted by objects on the ground.

Steep Turn Brings Stall And Fatal Dive to Ground

Wallace Hillyer was fatally injured and Jarvis R. Peddicord was seriously injured in an accident which occurred on August 20, 1941, at Dallas, Tex. Hillyer held a commercial pilot certificate with 1 Land, 2S Land and instructor ratings and had accumulated approximately 304 flying hours. Peddicord held a private pilot certificate and had flown about 121 hours. The aircraft, a Model 2 Fleet, was extensively damaged.

Instructor Hillyer, with Peddicord as student, took off from Love Field at approximately 3:15 p. m. for a check flight. A few minutes later the aircraft approached nearby McDowell Field from a southerly direction. With the engine throttled it glided to an altitude of about 50 feet over the center of the field and both occupants waved to persons on the ground. Power was applied and the aircraft proceeded to a point

over the northern end of the field where a shallow right turn was executed at an altitude of approximately 100 feet, following that maneuver the aircraft was momentarily leveled and then entered a steep, climbing, left turn. During the turn the plane stalled, fell off the left, and entered a steep dive which continued until the aircraft struck the ground in a nearly vertical attitude.

Subsequent investigations revealed no evidence of failure of the control system or structure or of malfunctioning of the engine. It was impossible to determine who was at the controls of the aircraft. Peddicord subsequently stated that due to the injuries suffered in the accident he was unable to recall details of the flight but that he believed the instructor was at the controls when the aircraft was stalled during the turn.

Probable cause.—Failure of the pilot to maintain flying speed during a steep turn at low altitude.

Pilot Hurt Starting Engine With Controls Unattended

Edwin C. Cheney was seriously injured in an accident which occurred on October 27, 1941, at Newberry, Mich. He held a private pilot certificate with a class 1 Land rating and had flown about 200 hours. The aircraft, a model 415C Erceupe, received major damage.

Cheney started the engine by swinging the propeller. There was no one in the cockpit and the wheels were not chocked. When the engine started, Cheney walked around the wing toward the cockpit. Before he got there, the ship started to move forward with increasing speed. He attempted to stop it by holding back on the tail surfaces. The aircraft, however, continued ahead in a turn until it struck a fence. During Cheney's attempts to check the motion he received two broken ribs.

Probable cause.—Action of pilot in starting engine while controls were unattended.

—Keep 'Em Flying—

Careless Passenger Walks Into Revolving Propeller

Miss Elizabeth Hurley was seriously injured in an accident which occurred on October 21, 1941, at the Municipal Airport, Lufkin, Tex. The propeller on the aircraft involved, a Model J-4E Piper, was damaged. Joseph O. Minton, the pilot, held a private certificate with a Class 1 Land rating and had flown approximately 90 solo hours. He was not injured.

Upon conclusion of a local pleasure flight with the airport manager, Jesse Warren, Miss Hurley got out of the left door of the plane, while Pilot Warren got out of the right door. The engine

Watch Your Landings!

More accidents occur in civil non-air-carrier flying while the aircraft is being landed than in any other flight operation. This was indicated in a recent which stated that for the year 1940 which stated that for the year 1940 (which also should be representative of recent experiences) a total of 3,471 accidents in non-air-carrier flying was reported to the Safety Bureau. Of these, 1,346, or 38.8 percent, occurred while the pilot was making a voluntary landing on a predetermined airport or field.

In general, the report states, these landing accidents were the result of inexperience. With the student pilot, the predominant fault was leveling the airplane off too high above the ground and dropping in. The private pilot was chief offender in colliding with trees, fences, wires, etc., landing on poor terrain, and misusing brakes.

Structural failure during landings was infrequent, with very few occurring in instructional flying. This is a compliment to aircraft maintenance in the instructional program.

The percentage of accidents which resulted in fatal or serious injuries was encouragingly small, approximately 3 percent. The report concludes "there is every reason to believe that the splendid training now available, the advancement in aircraft design, and the improvement of airports naturally will reduce this percentage."

Hints for Prevention

Following are a few pertinent hints for the prevention of landing accidents which the report suggests that pilots check over carefully:

1. Know the traffic rules of your own airport and of any other airport where you intend to land.

2. Be positive of the wind direction and velocity before landing. Land di-

rectly into the wind where possible, especially if you are not thoroughly familiar with the airport. Also practice cross-wind landings under favorable conditions on an airport with which you are familiar.

3. Satisfy yourself that there is no danger of collision with other aircraft in the vicinity before coming in to land.

4. Make sure that the ground area in which you intend to land is clear of aircraft and other hazards which might invite collision.

5. Be on the alert for airport obstructions such as wires, poles, fences, repair work, etc. Don't let familiarity breed contempt. Give them a wide berth.

6. Watch your air speed to prevent a stall and remember that a normal glide cannot be stretched.

7. Avoid too much air speed and the subsequent possibility of overshooting.

8. When gliding in, rev up the engine at frequent intervals and use heat control when necessary so that you will have power available should you find that you need it.

9. Know that your safety belt is fastened.

10. Avoid overuse of brakes. Don't attempt a turn when in a fast roll. Don't expect your brakes to stop your plane in 5 or 10 feet.

11. When approaching an airport with which you are not familiar, spot and remember the high obstructions, watch for holes, ditches, high weeds, construction work, and, of course, look carefully for other air traffic.

12. Above all, don't let your approach be a landing commitment. Be on the alert continually and, should any circumstances develop to add uncertainty to your landing, don't wait too long or let pride show you up for a green pilot, but "give her the gun" and go around again. That is what the "old timer" would do.

continued idling. Warren turned the plane over to Minton, who asked Miss Hurley whether she wished to accompany him on a short flight. She replied in the affirmative and started to walk around the front of the plane in order to enter from the right side as Minton had seated himself on the left. Warren, who was standing some distance from the plane, saw that Miss Hurley was walking toward the propeller and shouted a warning. However, she walked into the back of the revolving propeller.

As a result of this accident, the management at the airport has stated that certain rules will be promulgated which should prevent similar accidents in the future.

Probable Cause.—Carelessness of passenger in failing to avoid a revolving propeller.

Ferrying

(Continued from page 101)

ardizing C. A. A. inspectors and other employees in flying, maintenance, and other procedures, the Houston Center has been turned completely over to Army training. Major Griffin has been with the Civil Aeronautics Administration since 1933 and was in charge of the C. A. A. Instrument Training School at the Wayne County (Mich.) airport before it was moved to Houston last year. In that capacity he instructed and supervised the work of C. A. A. inspectors and airline pilots, and under his direction standards and uniform procedures and techniques for flying modern aircraft have been worked out and put into operation on American commercial aircraft throughout the world.



Hints to Airline Pilots Given by Glider Expert

To All Airline Pilots

At this time of the year pilots are again faced with the problem of cumulo-nimbus cloud hazards. The Safety Bureau of the Civil Aeronautics Board has twice before published a letter written by Mr. R. M. Stanley, an outstanding glider pilot, who contributed excellent data on the subject. This letter is again quoted below in the hope that it will furnish information of value.

"In response to your letter of October 8, I shall be glad to furnish the data which I have obtained concerning the strength and distribution of gusts to be found in cumulo-nimbus clouds. I have made a number of flights with a soaring plane into the interior of thunderstorms, and on one occasion, carried with me not only a barograph but also an accelerograph synchronized in such a manner that I could coordinate the gusts with the rate of climb which they produced. I have likewise made several flights in the interior of thunderstorms using powered airplanes, and I am fairly familiar with the internal structure of this type of cloud.

3,000 Feet a Minute

"The rate of climb which is obtainable in even a mild cumulo-nimbus cloud is in excess of 3,000 feet a minute, and there are flights on record in which pilots of soaring planes have gained 20,000 feet in less than 5 minutes, showing that the vigorous convection to be found within these clouds is not only high but sustained. The sharp-edged gust of 30 feet per second, which is used as the criterion of structural design, can easily be met and exceeded when flying under these extremely turbulent conditions.

"Soaring within thunderstorms, I have recorded accelerations of nearly 10g, only a small portion of which I attribute to pilot technique. Horizontal gusts sufficient to cause the airspeed meter to jump instantaneously 50 miles per hour in either direction have been encountered. This in itself represents a very severe condition, but an even worse condition exists due to the rapid fluctuations of these gusts. It is quite possible to have 4 or 5 oscillations of this amplitude occur in a period of less than 10 seconds. Striking head-on, the gust exerts a very powerful lifting action associated with the increase in

indicated airspeed. However, if the gust strikes from the side, it gives a very severe shear-type reaction, during which one can feel the vertical surfaces momentarily stall due to the high instantaneous side slips. The gust in the vertical plane will, of course, result in a severe load factor to the airplane, and there is no reason to believe that gusts in the vertical plane are not equal in intensity to those actually measured in the horizontal plane mentioned.

Definite Pattern

"The disposition of gusts within a matured or nascent cumulonimbus cloud seems to bear a very definite pattern in that the central core of the cloud is rising quite smoothly but at a very high rate. If the cloud's vertical velocity is sufficient, naturally hail will be found, the size depending upon the vigor of the cloud. Surrounding this vertically moving air is a zone of extreme turbulence, resulting from the shearing action of the upward moving air reacting against the outer envelope of the cloud, which in all cases is moving downward at a rate approximately one-half the rate of the rise of the cloud's core. It is in this region that the maximum turbulence exists.

"The vertical distribution within the cloud is approximately as follows: near the base of the cloud, the lift is mild and spread over a rather wide area. Ascending upward through the center, the rate of climb increases and the degree of turbulence in the boundary layer becomes more severe. At the level at which icing begins to appear and the rain turns to sleet, turbulence may be found even in the center core and will be most severe in the boundary zone. What exists above this icing level, I do not know first-hand, because of the fact that my soaring plane has always been equipped with a venturi-driven turn indicator, which has always iced-up at this point, necessitating my termination of the flight for reasons of safety.

Necked-in Portion

"A well-developed cumulo-nimbus cloud will have a necked-in portion occurring at the level at which freezing occurs to its moisture content. Above this layer lies the familiar anvil top which is produced by the impact of the upward-moving air against the isothermal layer of the stratosphere. However, circling this necked-in portion, I have invariably noted that hail continued to fall from the anvil above, showing that there is a diffusion of the center core of air and probably a reduction of turbulence can logically be expected. In clouds which have not

reached the cumulo-nimbus stage but are undergoing the early formation, turbulence is found to be greatest at the top.

"The intensity of the gusts and their disposition within the cloud seem to follow in general the pattern outlined above. It is possible for the air to be so gusty that an upward gust can be acting on one wing at the same time that a down gust is acting on the opposite, resulting in severe shearing action.

"These data have been given principally as a result of soaring flights using a sailplane with a wing load of 3.1 per square foot and ultimate strength factor of 12, fully equipped with blind flying instruments.

Cables Stretched

"Following one unusually severe flight inside a thundercloud, the rudder cables which had been prestretched to 60 percent of design loads and were operating over ball-bearing sheaves had become so badly stretched that it was no longer possible to control the rudder. Other parts of the control system suffered to a lesser degree, the wing attachment fittings, whose yield point is approximately 8g, showed a readily measurable amount of permanent set.

"In closing, I would summarize approximately as follows: the interior of a thunderstorm represents a condition of extreme hazard which should never be entered by any pilot without parachute and recent experience in blind acrobatic flight, and should never be done in an airplane other than a plane of special design incorporating high factors of safety. In fact, it would be on the side of caution to avoid flying below or in the immediate vicinity of clouds of this description due to the extremely high rate of climb existing beneath such formations and the consequent danger of being sucked up inside the cloud before the plane's airspeed can have carried it away from that vicinity."

Airlines Equipment Gets Higher Rating

Deliveries of materials and equipment used by commercial airlines in the operation and maintenance of their services have been given the higher limited blanket preference rating of A-1-j by the War Production Board. Previously the rating was A-3, established by P-47, issued September 12, 1941.

Other provisions of the original P-47 remain in effect. Air carriers and suppliers applying the higher preference rating, however, must furnish a copy of the amendment to each supplier to whom the original order was furnished. Copies of the new P-47 forms with the A-1-j rating soon will be available. Meanwhile, air carriers and suppliers have been requested to use the original P-47 and copies of the amendment.

New Type Approvals

(Approval numbers and dates of assignment in parentheses)

Type Certificates

Propellers

Fahlin, D-715, wood, 6 ft. 1 in. diameter, 3 ft. 6 in. pitch, 90 hp, 2500 rpm. (Type Certificate No. 783, 3-9-42.)

Hamilton Standard, 24D 4-blade propeller with 6487A blades or 6488A blades, steel hub and aluminum alloy blades, 13 ft. 2 in. to 10 ft. 2 in. diameter, hydromatic controllable (feathering) pitch, 1625 hp, 1275 rpm. (Type Certificate No. 784, 3-12-42.)

Hamilton Standard, 24E 4-blade propeller with 6353A blades or 6354A blades, steel hub and aluminum alloy blades, 11 ft. 8 in. to 11 ft. 2 in. diameter, hydromatic controllable (feathering) pitch, 1625 hp, 1435 rpm. (Type Certificate No. 785, 3-12-42.)

Hamilton Standard, 33E 3-blade propeller with 6243A blades or 6244A blades, steel hub and aluminum alloy blades, 15 ft. 2 in. to 12 ft. 2 in. diameter, hydromatic controllable (feathering) pitch, 2000 hp, 1103 rpm. (Type Certificate No. 786, 3-12-42.)

New Models Added to Old Type Approvals

(Approval numbers and dates of approval of new models in parentheses)

Engines

Wright, Cyclone 726C14AB1 and 2; 14 cyl. radial air cooled; maximum ratings: Except take-off, 1200 hp. at 2100 rpm. at 5400 ft. pressure altitude; Take-off, 1550 hp. at 2400 rpm. at sea level pressure altitude. (Type Certificate No. 176, 3-4-42.)

Propellers

Fahlin, D-626-C, wood, 7 ft. 6 in. to 7 ft. 0 in. diameter, 6 ft. 6 in. to 5 ft. 6 in. pitch, 145 hp, 2050 rpm. (Type Certificate No. 653, 3-3-42.)

Fahlin, D-627-C, wood, 7 ft. 6 in. to 7 ft. 0 in. diameter, 6 ft. 6 in. to 5 ft. 6 in. pitch, 145 hp, 2050 rpm. (Type Certificate No. 653, 3-3-42.)

Fahlin, D-628-C, wood, 6 ft. 10 in. diameter, 5 ft. 11 in. pitch, 145 hp, 2050 rpm. (Type Certificate No. 653, 3-3-42.)

Airworthiness Certificate Only, for Aircraft

(Phillips) Fleet 7, 2 place open land bi-plane. Engine, Phillips 333. (2-562, 3-10-42.) (Serial No. 403 only.)

Rating for Military Aircraft Broadened

Action has been taken by the War Production Board extending the assignment of higher preference ratings to deliveries for military and naval aircraft.

J. S. Knowlson, Director of Industry Operations, signed Preference Rating Order P-122, raising to an A-1-a or A-1-b all ratings assigned by any previously issued preference rating certificates (PD-1, PD-1A, PD-3, PD-3A, or PD-5) for military and naval aircraft.

An A-1-a rating was assigned by preference rating order P-109 issued February 20, 1942, to producers of certain types of military and naval aircraft



including bombers, fighters, observation planes, and transports.

With this latest action, military and naval aircraft of the "tactical" class, material to be incorporated in them, and material including machine tools to be used directly in the production of them, have a uniform A-1-a rating. Military and naval preliminary trainers and materials used in them or in the production of them have a uniform A-1-b rating.

Aircraft Spruce Lumber Put Under Price Ceiling

The Office of Price Administration has announced the fixing of maximum prices for aircraft spruce lumber, used in the manufacture of trainer planes for the United States Government and its allies, at levels prevailing in October 1941, under Maximum Price Regulation No. 109—AIRCRAFT SPRUCE.

The price regulation covers all transactions of 1,000 feet or more on and after April 1, 1942. It requires that every person who during any calendar month sells or delivers, or agrees to buy, buys, or receives a total of 1,000 board feet or more of aircraft spruce shall keep for inspection by the OPA, for a period of not less than 2 years, a complete record of such transactions.

New Aeronautical Publications

Among recent Government publications dealing with the subject of aeronautics are the following:

ARMY TECHNICAL MANUAL 1-408. Aircraft engine operation and test. Dec. 24, 1941. 64 pages illustrated. Price 15 cents. Classification number W 1.35:1-408.

ARMY TECHNICAL MANUAL 1-435. Aircraft sheet metal work. Dec. 31, 1941. 6 pages illustrated. Changes no. 1. Price 5 cents. Classification number W 1.35:1-435/ch. 1.

NAVY MANUAL—for the inspection of aircraft wood and glue for the United States Navy. 1941—2d edition. 167 pages illustrated. Price \$1.00. Classification number N 28.2: W 85/941.

When ordering these publications, send remittance by postal money order, express order, coupons, or check to the Superintendent of Documents, Government Printing Office, Washington, D. C. Always give title, issuing office, or classification number when listed.

Rubber Vital to Airplanes

There are more than 50 articles made from rubber or rubber synthetics used in the production of aircraft. Chief among these are tires and tubes, de-icer "boots," and bullet-proof gas tanks.

Plane Production Up 50%—Nelson

In an address opening the War Production Drive on March 17, Donald M. Nelson, Chairman of the War Production Board, declared that plane production had gone up more than 50 percent.

"America today is producing weapons of war in large volume," he said. "... They are the best in the world, and we are making a lot of them. Since Pearl Harbor, plane production, for example, has gone up more than 50 percent. But this is no reason for false complacency. We are nowhere near our goals. We need more and forever more of these weapons, and we need them now. We have got to realize the value of time."

Mr. Nelson also stated that second largest share of all funds made available for the war effort since June 1940 was for airplanes. The following excerpt from his speech explains the relation:

"From June 1940 until the Japanese attack, total funds voted by Congress for the war effort and made available for spending by the Reconstruction Finance Corporation came to \$64,329,000,000. From December 7 through March 5, \$72,603,000,000 was made available—a total of \$136,932,000,000.

"The largest share of the total—\$32,517,000,000, or 24 percent—was for the manufacture of tanks, guns, and ammunition. The next most important share—\$26,804,000,000, or 20 percent—was for airplanes."

—Keep 'Em Flying—

WPB Eases Restriction On Aircraft Material

In an amendment of Preference Rating Order P-109, the War Production Board has abolished the distinction between material to be physically incorporated into aircraft products and other necessary material used by companies producing military and naval aircraft.

This means that materials essential to the production of aircraft can be given the same rating as now is given materials that are used directly in the planes themselves. Ratings assigned by the amended order also can be applied to purchase orders previously placed. All ratings are fully extendible. The order, however, cannot be used for obtaining machine tools, ratings for which must be obtained by means of preference rating certificates.



Portable Turntable For Large Aircraft Wins Approval

Pilots, air-line officials, and airport managers have expressed their approval of a portable type turntable for large aircraft, developed by the Civil Aeronautics Administration and recently service tested by the U. S. Army and demonstrated at the Washington National Airport and at LaGuardia Field, New York City.

The activity of an airport, so far as ground plane movement is concerned, is generally concentrated at the Administration Building loading platform. As the congestion increases, the space available for plane maneuvering becomes more restricted. In an attempt to fix the radius of turn of loading or unloading aircraft, fixed or permanent type turntables have been installed at Floyd Bennett Field, Long Island, N. Y., and at the Washington National Airport. These turntables require reinforcement in the concrete or pavement surface immediately adjacent to the turntable pit and provisions must be made for draining the pit.

Suggested in 1941

The development of a portable type turntable, capable of being moved about an airport as required by changing operating conditions, self-draining, and needing no pavement reinforcing or anchorage, was suggested by the Airport Development Section, Technical Development Division, C. A. A., early in 1941.

In close cooperation with the International Stacey Corporation of Columbus, Ohio, an experimental unit was completed and tested in September, 1941, by C. A. A. personnel at the Experimental Station, Indianapolis, Ind. Following tests with a Douglas DC-3 airplane, the unit was returned to the fabricators for a few minor changes in design and improvement of the bearing mechanism.

U. S. Army officials evidenced an interest in the turntable development and, when the new unit was completed in January 1942, it was submitted to the U. S. Army for service testing. On completion of the U. S. Army tests, the turntable was installed at the Washington National Airport and tested with airline equipment.

Only 2 Inches High

The turntable, 5 feet 6 inches in diameter, with a 4-foot 6-inch revolving plate, is only 2 inches in height. Two

1/2-inch felt seals protect the 199%-inch steel ball bearing against dust and dirt. The unit weighs approximately 700 pounds, is self-draining and requires no anchorage to, or cutting of, the pavement surface. Four cap screws inserted through the upper plate and screwed through lugs in the skirt steel casting permit the device to be moved as a unit. A center eye-bolt is provided for hoisting the turntable.

The unit performed successfully under a one-wheel load of 20,500 pounds. Very little deflection of the top plate occurred and rotation was free under all loads imposed.

In addition to its possible military application, the turntable is a distinct contribution to civil aviation. Its manufacture will require only small quantities of critical materials and its use will prevent loss of rubber on tires and injury to pavement surfaces through the elimination of locked wheel turns. Landing gear failures, too, have been traced to torsional strains induced in the landing gear while making a locked wheel turn on a crowded airport apron.

Spring Hazards

(Continued from page 103)

with which we are concerned. Vigorous activity over wide areas is often encountered aloft along the warm front slope. This type is characterized by spontaneity of inception, conglomerate cloud masses of great depth and few avenues of alternate flight procedure. Icing and turbulence are frequently severe, and there is the ever present probability of hail. As a matter of fact, hail shafts are the rule rather than the exception in many regions of the country during this period. The thunderstorms associated with the spring cyclone's cold front are usually the most intense. This severity will be readily appreciated when one considers the prevalence of tornadoes in conjunction with disturbances during this season. A feature of utmost importance to the preparation of flight through areas affected by the cold front is the occurrence of these violent storms far ahead of the front's surface position. The development is often too rapid to permit full cognizance of severity and extent until the line of storms is full-fledged.

ICING

All of the often-repeated requirements for icing conditions occur with greatest frequency during this transitional period, and in some latitudes persist until May. The cloud and precipitation patterns of energetic spring storms are fre-

Airport Projects Approved

In accordance with the provisions of section 303 of the Civil Aeronautics Act, the Administrator of Civil Aeronautics has issued certificates of air navigation facility necessity, authorizing the expenditure of Federal funds in the operation of the following projects:

ARIZONA

Tucson, Municipal Airport (WPA) \$6,294

FLORIDA

Tampa, Henderson-Hillsborough County Airport (CAA-WPA) 317,580

GEORGIA

Macon, Municipal Airport-Herbert Smart Field (WPA) 18,674

MISSOURI

Grandview, Municipal Airport (WPA) 539,938

MONTANA

Havre, Municipal Airport (WPA) 4,578

NEW MEXICO

Deming, Municipal Airport (WPA) 14,252

NORTH CAROLINA

Wilmington, New Hanover County Airport (WPA) 94,297

NORTH DAKOTA

Fargo, Municipal Airport-Hector Field (WPA) 190,300

OREGON

Medford, Municipal Airport (WPA) 13,479

North Bend, Municipal Airport (WPA) 199,386

SOUTH DAKOTA

Huron, W. W. Howes Municipal Airport (WPA) 29,902

WASHINGTON

Hoquiam, Moon Island Airport (WPA) 71,216

Yakima, Yakima County Airport (WPA) 72,828

WISCONSIN

Milwaukee, General Mitchell Field-Milwaukee County Airport (WPA) 82,300

WYOMING

Sheridan, Sheridan County Airport (WPA) 5,134

quently excellent ice producers, since freezing temperatures are still rampant in the cold sectors and air masses are steadily increasing in moisture content.

This bulletin is not intended to supersede the many advices issued on this subject in the past, nor is it a glossary of all the varied situations important to the safety of aircraft operation during the Spring season. In reminding the more experienced airmen that particular care should be exercised in flight plan and execution, the Safety Bureau urges that junior personnel be especially alert. Some of the worst "rides" have been taken during this transition—any veteran pilot will tell you so.

CIVIL AERONAUTICS BOARD

OFFICIAL ACTIONS

Abstracts of Opinions, Orders, and Regulations

FOR THE PERIOD MARCH 15-31, 1942

ORDERS

ORDER No. 1604.....March 16, 1942

Revoked student pilot certificate No. S-296332, held by Frank Stephens, for piloting an aircraft at an altitude of less than 1,000 feet over an open-air assembly of persons.

ORDER No. 1605.....March 16, 1942

Authorize Pan American Airways, Inc., to transport the Naval Adviser to the Governor of Dutch Guiana from Lisbon, Portugal, to Port of Spain, Trinidad.

ORDER No. 1606.....March 16, 1942

Revoked student pilot certificate No. S-200629, held by Kenneth N. Edwards, for starting the engine of an aircraft without a competent operator attending the controls, and other violations of the Civil Air Regulations.

ORDER No. 1607.....March 17, 1942

Denied the petition of Eastern Air Lines, Inc., for reconsideration of the order of the Board (Serial No. 1576) re service to Huntsville, Ala., and ordered that said petition be withheld from public disclosure.

ORDER No. 1608.....March 17, 1942

Consolidated the petitions of Pan American Airways Co. (Del.) and Pan American Airways, Inc., for orders fixing and determining fair and reasonable rates of compensation for the transportation of mail in transatlantic service.

ORDER No. 1609.....March 18, 1942

Dismissed the complaint filed by the Administrator of Civil Aeronautics alleging certain violations of the Civil Air Regulations on the part of Roswell C. Morley, holder of private pilot certificate No. 38026-40.

ORDER No. 1610.....March 19, 1942

Authorized Pan American Airways, Inc., to transport a British Government official from Lisbon, Portugal, to Port of Spain, Trinidad.

ORDER No. 1611.....March 20, 1942

Suspended for 90 days student pilot certificate No. S-228642, held by Carl Akerley, Portsmouth, N. H., for piloting an aircraft at an altitude of less than 1,000 feet over a congested area in violation of the Civil Air Regulations.

ORDER No. 1612.....March 20, 1942

Suspended for 30 days private pilot certificate No. 62361-41, held by Howard

R. Hinchman, Jr., Canal Winchester, Ohio, for carrying a passenger when the dual controls of the aircraft had not been made inoperative, in violation of the Civil Air Regulations.

ORDER No. 1613.....March 20, 1942

Suspended for 30 days private pilot certificate No. 81317-41, held by Benjamin Franklin Otts, Rome, Ga., for making an instrument flight when he was not possessed of an instrument rating, in violation of the Civil Air Regulations.

ORDER No. 1614.....March 20, 1942

Suspended for 30 days the flight instructor rating of Glenn Will Spencer, holder of commercial pilot certificate No. 41195-40, for piloting an aircraft in an unairworthy condition, in violation of the Civil Air Regulations (Opinion and Order).

ORDER No. 1615.....March 23, 1942

Approved an agreement (Contract C. A. B. No. 216) between various air carriers and other carriers pertaining to the release of airline information affecting military matters.

ORDER No. 1616.....March 23, 1942

Approved an agreement (Contract C. A. B. No. 217) between United Air Lines Transport Corp. and Western Air Lines, Inc., relating to the joint occupancy of certain premises at San Diego, Calif.

ORDER No. 1617.....March 23, 1942

Temporarily amended certificates of public convenience and necessity of American Airlines, Inc., Transcontinental & Western Air, Inc., and United Air Lines Transport Corp. authorizing service to and from Long Beach, Calif., with respect to persons enrolled in or employed by the armed services on a flag stop basis. (Opinion and Order.)

ORDER No. 1618.....March 24, 1942

Authorized Braniff Airways, Inc. to suspend service temporarily between Amarillo, Tex., and Oklahoma City, Okla., until the further order of the Board.

ORDER No. 1619.....March 25, 1942

Suspended for 30 days private pilot certificate No. 16701-40 held by Lester Strayer Brady, for flying an aircraft acrobatically over a congested area of a city in violation of the Civil Air Regulations. (Opinion and Order.)

ORDER No. 1620.....March 25, 1942

Suspended for 6 months student pilot certificate No. S-292385, held by J. Z. Young, for operating an aircraft on a civil airway when he was not possessed of a pilot certificate, and other violations of the Civil Air Regulations (Opinion and Order.)

ORDER No. 1621.....March 25, 1942

Granted Western Air Lines permission to intervene in the application of West Coast Airlines for a certificate of public convenience and necessity authorizing scheduled air transportation of mail and property by the pick-up method.

ORDER No. 1622.....March 25, 1942

Authorized Pan-American Airways, Inc., to transport an Argentine Naval Attaché from Lisbon, Portugal, to Natal Brazil via Bolama, Portuguese Guinea.

ORDER No. 1623.....March 27, 1942

Suspended for 90 days student pilot certificate No. S-24035, held by Thor Papalias, New Orleans, La., for piloting an aircraft while the dual controls were fully operative, and other violations of the Civil Air Regulations.

ORDER No. 1624.....March 27, 1942

Suspended for 6 months student pilot certificate No. S-197209, held by Walter D. Dibble, Morris, Ill., for piloting an aircraft outside an area within the vicinity of the operating base of his instructor, and other violations of the Civil Air Regulations.

ORDER No. 1625.....March 27, 1942

Suspended for 60 days student pilot certificate No. S-135945 held by R. V. Clark, Los Angeles, Calif., for piloting an aircraft after sunset without navigation lights and other violations of the Civil Air Regulations.

ORDER No. 1626.....March 27, 1942

Suspended for 30 days student pilot certificate No. S-299829 held by Geo. Fenwick Click, Millersport, O., for repairing and altering an aircraft while not possessed of a mechanic certificate and other violations of the Civil Air Regulations.

ORDER No. 1627.....March 27, 1942

Suspended for 30 days student pilot certificate No. 233734 held by Robert M. Dodge, Columbus, O., for piloting an aircraft outside an area within a 50-mile radius of the operating base of his instructor in violation of the Civil Air Regulations.

ORDER No. 1628.....March 27, 1942
Revoked student pilot certificate No. S-72311 held by Robert Frank Timmons, for piloting an aircraft on a civil airway without having in his possession an identification card satisfactory to the Administrator in violation of the Civil Air Regulations.

ORDER No. 1629.....March 27, 1942
Granted Pan American Airways, Inc., permission to intervene in the application of American Export Airlines, Inc., for acquisition of control of American Export Airlines, Inc., by American Export Lines, Inc.

ORDER No. 1630.....March 27, 1942
Granted Pan American Airways, Inc., permission to use the 36th Street Airport at Miami, Fla.

ORDER No. 1631.....March 27, 1942
Consolidated applications of West Coast Airlines and Southwestern Airways Co. for temporary or permanent certificates of public convenience and necessity.

ORDER No. 1632.....March 26, 1942
Directed Braniff Airways, Inc., to show cause why the Board should not make final the findings and conclusions set forth in the Statement of Tentative Findings and Conclusions, dated March 25, 1942, and upon the basis thereof, fix, determine and publish the rates set forth in said Statement as the fair and reasonable rates of compensation for the transportation of mail over routes Nos. 9, 15 and 50. (Opinion and Order—Docket No. 666)

ORDER No. 1633.....March 28, 1942
Granted American Airlines, Inc., permission to intervene in the application of Southwest Airways Co. for a certificate of public convenience and necessity authorizing scheduled air transportation of mail and property by the pick-up method.

ORDER No. 1634.....March 30, 1942
Suspended for 30 days private pilot certificate No. 32747-40, held by William Scott Neal, for piloting an aircraft on a civil airway after sunset when said aircraft was not equipped with navigation lights in violation of the Civil Air Regulations.

ORDER No. 1635.....March 30, 1942
Suspended for 6 months student pilot certificate No. S-346914 held by Charles A. Cowan, for piloting an aircraft outside an area within the vicinity of the operating base of his instructor and other violations of the Civil Air Regulations.

ORDER No. 1636.....March 30, 1942
Revoked student pilot certificate No. S-324462, held by A. J. Roth, for piloting an aircraft within a control zone when the weather was below the minimums allowed for contact flight and while he was not the holder of a valid instrument rating and when the aircraft was not equipped for instrument flight, and other violations of the Civil Air Regulations.

Opinion Available

Civil Aeronautics Board Opinion No. 58 of Volume 3 is now available in printed form as an advance sheet prior to its inclusion in the bound volume. Its title is CANADIAN COLONIAL AIRWAYS, INC.—CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY (Burlington-Albany-Glens Falls-Lake Placid Operations), Docket No. 377.

Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 5 cents each. When ordering, include the opinion serial number and the docket number as well as the opinion title.

ORDER No. 1637.....March 30, 1942
Amended Order, Serial No. 1193, so as to permit Harold C. Phillips to apply for any type of pilot certificate between April 1 and May 1, 1942, provided that if he shall not have been accepted for the work of ferrying military aircraft by May 15, 1942, such certificate shall be suspended.

ORDER No. 1638.....March 30, 1942
Amended Order, Serial No. 1421, so as to permit Howard Poberzny to apply for a student pilot certificate between April 1 and May 1, 1942, provided that if he shall not have been accepted for British flight training by May 15, 1942, such certificate shall be suspended.

ORDER No. 1639.....March 30, 1942
Temporarily exempted Pennsylvania-Central Airlines Corp. from the provisions of section 401 (a) of the Civil Aeronautics Act insofar as said provisions would otherwise prevent it from engaging (1) in the air transportation of mail to and from Flint, Mich., as an intermediate point on Route No. 32 and (2) in air transportation between Traverse City and Grand Rapids, Mich., on Route No. 41 without regard to the seasonal restriction in its certificate of public convenience and necessity.

ORDER No. 1640.....March 30, 1942
Authorized Pennsylvania-Central Airlines Corp. temporarily to suspend service between Flint, Saginaw-Bay City and Traverse City, Mich., on Route No. 41.

REGULATIONS

REGULATION No. 200.....March 10, 1942
Effective March 10, 1942:

"The provisions of Part 50 of the Civil Air Regulations with respect to maintaining suitable hangar space, sufficient to house adequately all aircraft used for the purpose of flight instruction at least equal in quality and quantity to those required for the issuance of a flying school rating and certificate shall not apply to the Pathfinder Flying Service while conducting its operations at Carson City, Nevada, pursuant to the provisions of its 1942 Spring Civilian Pilot Training contracts."

REGULATION No. 210.....March 14, 1942
Effective March 14, 1942:

"Notwithstanding any provisions of the Civil Air Regulations to the contrary, the

Administrator may in his discretion in particular instances permit an air carrier when engaged in overseas or foreign air transportation, other than foreign air transportation between any place in the United States and a place in the Dominion of Canada, to exceed the gross weight limitations now specified in its air carrier operating certificate and in the airworthiness certificates of its aircraft: *Provided*, That in any such instance the transportation of all cargo and passengers is necessary to the prosecution of the war effort or the preservation of life."

REGULATION No. 211.....March 18, 1942
Effective March 18, 1942:

"The provisions of Part 50 of the Civil Air Regulations with respect to maintaining suitable hangar space, sufficient to house adequately all aircraft used for the purpose of flight instruction at least equal in quality and quantity to those required for the issuance of a flying school rating and certificate shall not apply to the Progressive Flying Service and John Stuart Barham while conducting their operations at Yelland Field, Ely, Nevada, pursuant to the provisions of their 1942 Spring Civilian Pilot Training contracts."

Amendment 20-37.....March 27, 1942
Effective April 1, 1942:

1. Amend section 20.33 to read as follows: "20.33 *Duration*. A pilot certificate shall be of 60 days' duration and, unless the holder thereof is otherwise notified by the Administrator within such period, it shall continue in effect thereafter until otherwise specified by the Board unless suspended, revoked, or voluntarily surrendered, or until the holder thereof has applied for and has been issued a new certificate of a different grade to pilot the same type of aircraft."

2. Insert after section 20.33 a new section 20.330 to read as follows:

"20.330 *Existing certificates*. A pilot certificate currently effective on April 1, 1942, shall continue, in effect for a period of 60 days subsequent to the date of its issuance and, unless the holder thereof is otherwise notified by the Administrator within such period, shall continue in effect indefinitely thereafter, unless suspended, revoked, or voluntarily surrendered, or until the holder thereof has applied for and has been issued a new certificate of a different grade to pilot the same type of aircraft: *Provided*, That no limited commercial certificate shall remain effective after May 1, 1942: *Provided, further*, That a pilot certificate under suspension on April 1, 1942, shall, after reinstatement, continue in effect in accordance with the provisions of this section applicable to currently effective pilot certificates."

3. Strike section 20.34 in its entirety.

4. Strike section 20.35 in its entirety and insert in lieu thereof the following: "20.35 *Expired certificates: special issuance*. The holder of any pilot certificate which has expired subsequent to April 1, 1941, upon application to any inspector made within one year of its expiration, may obtain a permanent certificate of the same or equivalent grade to pilot aircraft of the same type and with the same special ratings theretofore held by such person immediately prior to its expiration by passing a flight test appropriate to his grade of certificate. Such person shall be issued an aircraft rating based on the aircraft in which he passed such flight test."

Amendment 20-38.....March 27, 1942
Effective April 1, 1942:

Amend section 20.38 to read as follows: "20.38 *Surrender*. A holder of a pilot certificate shall, upon request, surrender such certificate to any officer or employee of the Administrator if it has been suspended or revoked."

Amendment 20-39.....March 27, 1942
Effective April 1, 1942:

1. Strike section 20.43 in its entirety.

2. Strike section 20.44 in its entirety.

AMENDMENT 20-40.....March 27, 1942
Effective April 1, 1942:

1. Strike section 20.618 and insert in lieu thereof a new section (20.618) to read as follows:

"20.618 *Recent experience requirements*.

20.6180 Solo flight. A certificated pilot who within the preceding 6 months has not made and logged at least 5 take-offs and 5 landings to a full stop in an aircraft of the type and class proposed to be flown shall pass a flight check in such aircraft before otherwise piloting aircraft of that type and class. Such check flight shall be given by a certificated pilot of private grade or higher qualified according to § 20.6181 in an aircraft of the same type and if an airplane, within the same class as that of the aircraft proposed to be flown.

20.6181 Passenger flight. A certificated pilot shall not pilot any civil aircraft carrying any other person (other than a certificated pilot of at least private grade or higher, rated for the aircraft operated and possessed of the recent experience required by this section or any member of the crew thereof) unless, within the 90 days immediately preceding, he shall have made and logged at least 5 take-offs and 5 landings to a full stop in an aircraft of the same type and if an airplane, within the same class as that of the aircraft in which any such person is carried: *Provided*, That a pilot while flying in scheduled air transportation shall be governed as to recent experience for passenger flight by the provisions of Part 61.

20.6182 Instructional flight. No flight instructor shall give flying instruction in civil aircraft to any other person unless within the 12-month period immediately preceding the giving of such instruction he shall either—

(a) while possessed of a valid instructor's rating have given at least 10 hours of flight instruction in aircraft for which he is rated at the time of giving such instruction a valid aircraft rating, or

(b) have passed such practical flight test as the Administrator deems necessary and appropriate to demonstrate continued proficiency for giving flight instruction.

20.6183 Night flight. No person shall take off and land a civil aircraft carrying passengers during the period of one hour after sunset and one hour before sunrise, unless he has made and logged at least 5 take-offs and 5 landings to a full stop during such period within the 90 days immediately preceding such take-off or landing.

20.6184 Instrument flight. A certificated pilot shall not pilot any civil aircraft under instrument conditions (except when accompanied by a certificated pilot possessed of a valid instrument rating) unless he is possessed of a valid instrument rating and has had during the preceding 6-month period at least 2 hours of flight time solely by reference to instruments either under actual or properly simulated instrument flight conditions."

2. Insert a new section (20.62 through 20.621) to read as follows:

20.62 Periodic physical examination. (a) A certificated pilot shall not pilot an aircraft in flight unless within the 12-month period immediately preceding such flight he has met the physical requirements for original issuance of his certificate by passing an examination, given by an authorized medical examiner of the Administrator.

(b) In lieu of the physical examination conducted by an authorized medical examiner of the Administrator, a certificate from the appropriate officer in charge of flying in the Army, Navy, Marine Corps, or Coast Guard certifying that the applicant is on pilot status solo in such service will be accepted as evidence of the physical fitness required for the issuance of any medical certificate provided for in this Part: *Provided*, That the physical qualifications required for such pilot status are not less than those required by these regulations for the grade of pilot certificate applied for.

20.620 Medical certificate. A medical certificate issued by an authorized medical examiner of the Administrator, or other evidence satisfactory to the Administrator that the pilot has met the requirements of § 20.62 shall be carried by the pilot while piloting aircraft.

20.621 Correcting lenses. A certificated pilot who, at his most recent periodic physical examination, met the physical qualifications for original issuance of his grade of certificate in accordance with § 20.62 only by the use of correcting lenses shall not pilot aircraft in flight without wearing such correcting lenses, and a statement to that effect shall be endorsed by the medical examiner on his medical certificate.

20.622 Reports. At the time of each physical examination the pilot shall furnish to the medical examiner, to be forwarded by him to the Administrator, a report setting

forth the amount and type of his aeronautical experience, and such other pertinent data as the Administrator may require, since his last preceding medical examination."

AMENDMENT 20-41-----March 27, 1942 Effective April 1, 1942:

Amend section 20.64 to read as follows:
"20.64 (Unassigned)"

AMENDMENT 20-42-----March 27, 1942 Effective April 1, 1942:

Strike sections 20.7 through 20.712.

AMENDMENT 20-43-----March 27, 1942 Effective April 1, 1942:

1. Strike from the table of contents the words "20.34 Periodic endorsement requirements" and insert in lieu thereof the words "20.34 (Unassigned)."

2. Strike from the table of contents the words "20.43 Periodic endorsement requirements with respect to special ratings" and insert in lieu thereof the words "20.43 (Unassigned)."

3. Strike from the table of contents the words "20.44 Special issuance of special ratings" and insert in lieu thereof the words "20.44 (Unassigned)."

4. Strike from the table of contents the words "20.64 Night flying" and insert in lieu thereof the words "20.64 (Unassigned)."

5. Strike from the table of contents the words "20.35 Effect of expired certificates: special issuance" and insert in lieu thereof the words "20.35 Expired certificates: special issuance."

6. Strike from the table of contents the words "20.62 (Unassigned)" and insert in lieu thereof the words "20.62 Periodic physical examination."

AMENDMENT 40-10-----March 13, 1942 Effective March 13, 1942:

1. Strike the words "July 1, 1942," as they appear in section 40.2320 and insert in lieu thereof the words "January 1, 1943."

2. Strike the words "July 1, 1942," as they appear in section 40.2330 and insert in lieu thereof the words "January 1, 1943."

3. Strike the words "July 1, 1942," as they appear in section 40.2500 and insert in lieu thereof the words "January 1, 1943."

4. Strike the words "July 1, 1942," as they appear in section 40.3320 and insert in lieu thereof the words "January 1, 1943."

AMENDMENT 60-62-----March 25, 1942 Effective March 25, 1942:

Amend section 60.344 to read "Unassigned."

AMENDMENT 60-63-----March 25, 1942 Effective March 25, 1942:

Add a new section 60.97 to read as follows:
"60.97 Transportation of explosives. The following regulations shall govern the carriage of explosives in civil aircraft:

"60.97a Explosives defined. As used in this section (60.97) the term 'Explosives' shall mean any article or substance classed as 'Class A Explosives,' 'Class B Explosives,' 'Class C Explosives,' 'Not accepted' or 'Forbidden,' by the Interstate Commerce Commission in Part 2 of its Regulations for the Transportation of Explosives and Other Dangerous Articles by Land and Water in Rail Freight, Express, and Baggage Services, and by Motor Vehicle (Highway), and Water, effective January 7, 1941. It shall not include the aircraft's signalling or safety equipment (such as a Very pistol or landing flares), nor materials for industrial or agricultural spraying, nor shall it include small arms ammunition in the possession of (a) a member of the flight crew; (b) a member of the armed forces of the United States, or of the armed forces of any of its allies; or (c) an official, employee, or officer of the United States, a State, Territory, or Possession, or a political subdivision of any such State, Territory, or Possession who is lawfully carrying arms on official duty.

"60.971 Prohibited Explosives. No person shall operate a civil aircraft in flight carrying any article listed by the Interstate Commerce Commission as a forbidden explosive for shipment by freight, in Part 4, Section

503, of its Regulations for the Transportation of Explosives and Other Dangerous Articles by Land and Water in Rail Freight, Express, and Baggage Services, and by Motor Vehicle (Highway), and Water, effective January 7, 1941.

"60.972 Acceptable Explosives. No person shall operate a civil aircraft in passenger flight carrying any explosives other than those listed by the Interstate Commerce Commission as 'acceptable explosives' for shipment by express in Part 5, Section 654, of its Regulations for the Transportation of Explosives and Other Dangerous Articles by Land and Water in Rail Freight, Express, and Baggage Services, and by Motor Vehicle (Highway) and Water, effective January 7, 1941. For the purposes of this section (60.97) an aircraft is deemed to be in "passenger flight" whenever there is aboard such aircraft in flight any person other than a member of the flight crew, a member or representative of the armed forces of the United States or any of its allies, or a representative of the Civil Aeronautics Administration, or of the Civil Aeronautics Board.

"60.973 Packing and Shipping Precautions. No person shall operate a civil aircraft in flight carrying explosives not otherwise prohibited by this section (60.97) unless:

(a) such explosives have been appropriately packed and marked in accordance with the regulations of the Interstate Commerce Commission in effect on March 25, 1942; and
(b) such explosives are being shipped by or for the armed forces of the United States or any of its allies; and

(c) such explosives have been placed in a baggage compartment inaccessible to passengers during flight, in which compartment nothing is being carried at the time other than such explosives; and

"(d) such explosives have been firmly lashed to the aircraft structure in such manner as to prevent shifting in flight."

AMENDMENT 61-63-----March 23, 1942 Effective March 23, 1942:

Strike the words "April 1, 1942," as they appear in section 61.341, and insert in lieu thereof the words "July 1, 1942."

Schools

(Continued from page 101)

cal and educational leaders invited to help guide development of the program.

The two agencies announced that the committee's purposes would be:

1. To serve as a general clearing house committee in which the related objectives and problems dealing with aviation education of the four Governmental agencies (Army, Navy, U. S. Office of Education, and Civil Aeronautics Administration) may be discussed, duplication of purposes and operating procedures eliminated, and mutual cooperation secured.

2. To stimulate a consciousness and recognition of the need for providing aviation education for American youth.

3. To initiate the promotion of aviation education programs for the pre-college age group which will be rapidly geared to the war needs, and which will enable these youth to prepare for a post-war period in which the airplane will bring about great changes in our economic and social life.

4. To secure a rapid and sound development of aviation education in the schools of the country.

5. To review and to advise concerning plans and proposals when submitted by various sub-committees.

The executive committee includes Commissioner Studebaker; Assistant

(Continued on next page)

Schools

(Continued from preceding page)

Secretary Hinckley; representatives of Army and Navy air arms; Ben D. Wood, Director of the Bureau of Collegiate Educational Research, Columbia University, and chairman of the national joint committee; Gill Robb Wilson, President of the National Aeronautic Association; N. L. Engelhardt, Associate Director of the Division of Field Studies, Institute of Educational Research, Columbia University; T. G. Pullen, Jr., Maryland State superintendent of public instruction, and Bruce Uthus, assistant to Mr. Hinckley.

"Everyone recognizes that aviation will be a vital factor in determining the result of this war as well as a major factor in post-war economy," said Mr. Hinckley. "This program is intended to assure a flow of youth versed in aviation to meet war needs and to prepare for the tremendous post-war expansion that is in store for civil aviation."

The Office of Education and Civil Aeronautics Administration bring to this assignment a record of experience and service. The U. S. Office of Education is the Federal government's link with 26,000 public high schools and almost a quarter million elementary schools. It has prepared a basic course in aviation education now being taught in District of Columbia schools. Currently it is conducting a program through State departments of education to supply 500,000 scale models of United Nations and Axis warplanes to the U. S. Navy for training purposes.

Trained 75,000 Pilots

Since 1939 the Civil Aeronautics Administration, Federal governing body for civilian aviation, has trained 75,000 civilian pilots, and currently its elementary program is turning out 2,000 pilots a month.

How the broad aims of the program to stimulate interest in aviation among school youth might be accomplished was outlined briefly by Commissioner Studebaker.

"We expect the committee to evolve new programs which schools may add to their curriculums," he said, "but existing courses can also emphasize aspects of aviation."

"Teachers can explain the theory of flight in physics, and essentials of navigation in mathematics. They can brighten geography by following through many lands the course of famous flights, and in history classes go back to Leonardo da Vinci, who first set down basic laws of aerodynamics in the 15th Century."

Members Listed

Invited members of the national joint advisory committee are:

Dr. Ben D. Wood, Chairman, Columbia University, New York City.

Mr. R. V. Billington, Executive Assistant, Division of Vocational Education,

U. S. Office of Education, Washington, D. C.

Dr. Dean R. Brimhall, Director of Research, Civil Aeronautics Administration, Washington, D. C.

Dr. Leonard Carmichael, President, Tufts College, Middlesex, Mass.

Mr. Willard Combs, Supervisor of Aviation Courses, Secondary Schools, Des Moines, Iowa.

Mr. Claude V. Courter, Superintendent of Public Education, Cincinnati, Ohio.

Dr. N. L. Engelhardt, Teachers College, Columbia University, New York City.

Dr. Raymond Franzen, Statistical Consultant on Research for C. A. A., 9 Rockefeller Plaza, New York City.

Dr. Robert W. Hambrook, Senior Specialist in Trade and Industrial Education, U. S. Office of Education, Washington, D. C.

Mr. Chester W. Holmes, Asst. Superintendent of Schools, Washington, D. C.

Dr. H. W. Hurt, National Director of Reading Program, Boy Scouts of America, 2 Park Avenue, New York City.

Dr. Carl A. Jessen, Senior Specialist in Secondary Education, U. S. Office of Education, Washington, D. C.

Dr. Alexander Klemens, Professor of Aeronautical Engineering, New York University, New York City.

Dr. Paul R. Mort, Teachers College, Columbia University, New York City.

Mr. T. G. Pullen, Jr., State Superintendent of Schools, Baltimore, Md.

Captain A. W. Radford, Bureau of Aeronautics, Navy Department, Washington, D. C.

Mr. Charles I. Stanton, Acting Administrator, Civil Aeronautics Administration, Washington, D. C.

Mr. Frank Tichenor, Publisher, Aero Digest, 515 Madison Avenue, New York City.

Mr. Bruce Uthus, Assistant to Mr. Hinckley, Department of Commerce, Washington, D. C.

Captain Gill Robb Wilson, President, National Aeronautic Association.

Major-General B. K. Yount, Commanding General, Army Air Forces, Flight Training Command, War Department, Washington, D. C.

Dr. Maris M. Proffitt, Consultant in Guidance and Industrial Education, U. S. Office of Education, Washington, D. C.

Mr. L. Welch Pogue, Chairman, Civil Aeronautics Board, Washington, D. C.

- Keep 'Em Flying -



Women

(Continued from page 102)

beginning to find that there seems to be no work dependent upon skill and dexterity that women cannot be taught to do very well. In fact, women have superior tactile sense and much greater patience at repetitive tasks than men. They also have unusual ability to follow instructions literally and skillfully."

Observing from experience since that statement was made several months ago, the company now summarizes its views this way:

"They have proved, on the whole, good workmen; though the same differences in skills and temperaments may be observed among them as among men. We use them both in groups of women and on the benches and lines with men. We have had equal success with one man and one woman on a riveting team and with two women. They do all kinds of light sheet-metal work except the handling of heavy machine tools. They are particularly skillful as welders, both acetylene and arc. They are excellent at woodworking and finishing; though, for health reasons, we have kept them out of the paint shops. They show fine adherence to prescribed routines in sub and major assembly."

Officials of Vultee answer the question of how well women work in their plant by reporting that women have less tendency to move from plant to plant than men, and a larger proportion of women workers in this plant have taken advantage of free training classes. Basic to Vultee's successful use of women, right up into the final assembly line, was careful preparation for the introduction of women into some of these departments.

Another important item of Vultee policy is that all the supplementary training courses given by the plant are open to women. This assures the most effective use of women all along the production line and provides them with opportunity equal to that of men in any promotion or up-grading.

How far can the current trend toward increased use of women go? While a precise prediction is impossible, here are some helpful facts: At the close of the first World War women comprised 20 percent of the employees in United States aircraft factories; current reports indicate that in Germany and Great Britain 40 to 50 percent of aircraft workers are women.

There are, of course, limitations to the class of work which women can do, but fundamental progress has been made in the employment opportunities open to them. Formerly custom, habit, the attitude of other employees, the attitude of unions, the attitude of management, and considerations of cost, all served to curtail the number and kind of openings available to women. That is all changing. Today we have only one problem—to win the war. We are striving for increased total production.

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